

NON-PUBLIC?: N
ACCESSION #: 8810250442
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Trojan Nuclear Plant PAGE: 1 OF 4

DOCKET NUMBER: 05000344

TITLE: Reactor Trip on Overtemperature Delta Temperature - Personnel Error and
Procedural Inadequacy
EVENT DATE: 09/16/88 LER #: 88-028-00 REPORT DATE: 10/17/88

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Larry Hinson, Plant Review Board Engineer TELEPHONE: (503) 556-3713

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: BA COMPONENT: MO MANUFACTURER: L200
REPORTABLE TO NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: NO EXPECTED SUBMISSION DATE:

ABSTRACT:

On September 16, 1988, preparations were being made to replace failed pressurizer pressure transmitter PT-458. The bistables associated with this transmitter, including one which provides input to one channel of the overtemperature delta temperature circuit (OTDT), were in the tripped position. While establishing conditions necessary for replacement of the PT-458 transmitter, a technician erroneously tripped the input bistable from another pressurizer pressure transmitter to the OTDT circuit. This satisfied the two out of four OTDT trip logic, causing a reactor trip at 0830.

The causes of this event were deficiencies in the work instructions for the PT-458 transmitter replacement, personnel error (procedural) and inadequate supervision. The work instructions directed that the correct bistable be checked as tripped, but listed the wrong cabinet as its location. The technician then entered this incorrect cabinet and checked position of a bistable other than the one specified in the work instructions. Upon finding this incorrect bistable not tripped, he decided to trip the bistable despite instructions which stated to only check the bistable as tripped. Inadequate supervision was evidenced by lack

of an adequate pre-evolution briefing and lack of an adequate verification/validation of the work instructions.

A detailed critique of this event conducted by senior management personnel identified numerous plant practices which are being revised as a result of this event. This event had no effect on public health and safety.

END OF ABSTRACT

TEXT PAGE 2 OF 4

Description of Event

On September 16, 1988, the plant was in Mode 1 (power operation) with the Reactor Coolant System (RCS) at 585 degrees F and 2235 psi. Safety Injection pump 'B' was removed from service for maintenance. Pressurizer pressure transmitter PT-458 was out of service and its associated bistables tripped as a result of its failure on September 13, 1988. The tripped bistables included the transmitter's input to one of the four overtemperature delta temperature (OTDT) reactor trip channels, thus placing this OTDT channel in the tripped condition. Work was in progress to replace the failed PT-458 transmitter. At 0830 a reactor trip occurred on OTDT. While making preparations to replace the PT-458 transmitter, a technician erroneously tripped the input bistable from another pressurizer pressure transmitter to the OTDT circuit. This satisfied the two out of four channel logic for a reactor trip on OTDT.

The OTDT reactor trip protects against Departure from Nucleate Boiling. The setpoint is in terms of percent of rated full power loop delta-temperature and will vary based on T_{avg} , pressurizer pressure and axial flux difference. Each of the four OTDT channels receives temperature input signals from one of the four reactor coolant loops. One power range nuclear instrument channel and one pressurizer pressure channel separately feed each OTDT channel. If two out of four OTDT channels exceed their setpoint, a reactor trip occurs.

Pressurizer pressure transmitter PT-458 (Barton Model 763A), which supplies a signal to OTDT protection set IV, was removed from service following its failure on September 13, 1988. Its associated bistables, including bistable ITS/441C for OTDT protection set IV located in control rack R15, were therefore placed in the tripped condition. This associated OTDT channel was thus in the tripped condition. On September 16, 1988, preparations were being made to replace the PT-458 transmitter. Prior to commencing actual transmitter replacement, it was required that bistables associated with the transmitter be checked to be in the tripped position. The work instructions prepared for this evolution directed that the correct bistable (ITS/441C) be checked tripped, but incorrectly listed its location as control rack R2. The technician performing the work opened rack R2 as directed, resulting in a Control Room annunciator indicating entry to

protection set I. The Control Operator acknowledged this annunciator and questioned why entry was being made to this protection channel. Before further action could be taken by the Control Operator, the technician tripped bistable ITS/411C for protection set I, completing the necessary two out of four channel logic for an OTDT reactor trip.

The reactor trip on OTDT occurred at 0830. Train 'A' and 'B' auxiliary feedwater (AFW) pumps started on a steam generator low-low water level trip signal. A feedwater isolation occurred on reactor trip coincident with a low RCS Tavg signal. Operators responded to the trip in accordance with Emergency Instruction (EI)-O, "Reactor Trip, Safety Injection and Diagnosis". At 0905 it was discovered that auxiliary feedwater (AFW) control valve CV-3004A1 to the "A" steam generator could not be remotely positioned from the control

TEXT PAGE 3 OF 4

Room. The valve was properly positioned to deliver the correct AFW flow rate, however capability to throttle the valve from the Control Room was not available. The power cable to the valve's motor operator (Limitorque SMB-000) was found to be resting on the operator's manual clutch lever, depressing the lever and placing the valve in the manual mode of operation. The cable was moved off the lever, and capability to operate the valve from the Control Room restored at 0910. All other plant equipment responded as designed. The electric AFW pump was started at 0922 and the Train 'A' and 'B' AFW pumps were subsequently shut down. An immediate report was made to notify the Nuclear Regulatory Commission of this event at 0925.

Cause of Occurrence

The causes of this event were deficiencies in the work instructions for the PT-458 transmitter replacement, personnel error (procedural) and inadequate supervision. Errors were made in writing the work instructions for the PT-458 transmitter replacement. These instructions directed the technician to check bistable ITS/441C in rack R2 in the tripped position. The location of the bistable required to be tripped (ITS/441C) was incorrectly listed as cabinet R2 vice R15. This same error was also made for another bistable (ITS/441D-OTDT Rod Stop). This error led to the technician entering the wrong protection cabinet, placing him in position to trip the wrong bistable. Once in the wrong cabinet, the technician checked the condition of bistable ITS/411C (the pressurizer pressure bistable for this incorrect OTDT channel) vice ITS/441C as directed by the work instructions. Upon finding bistable ITS/411C not tripped, he placed this bistable in the tripped position instead of investigating this discovery of an unexpected condition. The procedure being used by the technician did not direct checking of bistable ITS/411C nor moving of any bistable switch. The technician was aware that bistables were already tripped for the failed PT-458 transmitter.

Supervision of this evolution was also found to be inadequate. The pre-work briefing to ensure that all personnel from each discipline involved clearly understood plant conditions and potential hazards was inadequate. Adequate verification/validation of the work instructions was not performed prior to commencing the work. The intent of directions in the work instruction to check a bistable tripped was not clearly conveyed to the technician. It was intended that an expected condition should be verified. Instead, action was taken to reposition the bistable vice asking why as-found conditions differed from the expected.

The cause of the loss of capability to remotely operate CV-3004A1 was that the motor operator's clutch lever was depressed by the motor's power conduit. The conduit was improperly routed over the operator, thus putting it in position to depress the clutch lever.

TEXT PAGE 4 OF 4

Corrective Action

The immediate corrective action following the reactor trip was to carry out the emergency instruction recovery actions. The power conduit for valve CV-3004A1 was removed from the clutch lever and the valve's remote operation capability restored. All other AFW control valves were verified not to have a similar problem. Immediate notification of this event was provided to the NRC at 0925.

A detailed critique of this event was conducted by senior management personnel. Several examples of management's expectations not being met by observed performance were identified. Corrective actions taken or planned as a result of this investigation include:

A standing night-order has been issued to operations to require that technicians and operators be in constant communication while entering protection cabinets and tripping bistables. This order will remain in effect until similar requirements are incorporated into plant Instrument and Control procedures. These procedures will be revised by December 16, 1988 (CTL 21870).

Requirements for the conduct of pre-evolution briefings have been issued.

Standards will be established by November 30, 1988, to clearly define the meaning of terms such as Check, Verify, Ensure, etc., as they are used in plant procedures and work instructions (CTL 21871).

Requirements will be established for verification/validation of

procedures and work instructions that affect plant safety systems by November 4, 1988 (CTL 21872).

Different key locks have been provided on each of the protection set racks to preclude opening the wrong train's cabinet.

Maintenance Procedure (MP)-12-5, "Motor Operated Valves", will be revised by December 16, 1988, to include a requirement to verify the valve's clutch lever is not obstructed during performance of periodic valve inspection (CTL 21873).

Significance of Occurrence

This event had no effect on public health and safety. There was no actual plant condition requiring a reactor trip; however, the reactor protection system functioned as designed to trip the reactor on receipt of an OTDT trip signal on two channels. Although AFW control valve CV-3004A1 could not be throttled from the Control Room, the valve was properly positioned to deliver the correct AFW flow rate.

ATTACHMENT 1 TO 8810250442 PAGE 1 OF 1

PGE

Portland General Electric Company October 17, 1988
Trojan Nuclear Plant CAO-340-88
71760 Columbia River Hwy
Rainier, Oregon 97048
(503) 556-3713

US Nuclear Regulatory Commis
ion
Document Control Desk
Washington, D.C. 20555

Gentlemen:

Licensee Event Report No. 88-28 is attached. This report describes an event in which the reactor was inadvertently tripped during replacement of a failed pressurizer pressure transmitter.

C. A. Olmstead
General Manager
Trojan Nuclear Plant

c: Mr. John B. Martin

Regional Administrator
US Nuclear Regulatory Commission

Mr. Bill Dixon
State of Oregon
Department of Energy

Mr. R. C. Barr
USNRC Resident Inspector
Trojan Nuclear Plant

*** END OF DOCUMENT ***
